costs themselves. Only by considering demand responsiveness to price can common costs be allocated in a way that minimizes the resulting damage to economic efficiency.

Methods focusing solely on cost-side considerations include:

- *Relative use of common plant:* Under a relative use of common plant methodology, common costs are allocated in proportion to the extent to which various services make use of the common plant.
- *Proportion of directly assignable costs:* Under this approach, common costs are allocated in proportion to the directly assignable costs associated with different services.

Because these two approaches are not based on the principle of cost causation, they create misincentives for both initial investment decisions and choice regarding the expansion of service. The distortions in investment comes because prices will be forced above incremental costs, which may encourage inefficient investment in substitute facilities by rivals and discourage potentially valuable investment in complementary facilities. Moreover, since an increase in output of a service will lead to a greater allocation of common costs to that service, this allocation method has the effect of recovering non-traffic-sensitive costs on a traffic-sensitive basis, which creates incentives to set prices inefficiently high. Further, because they do not take demand conditions into account, these approaches do not minimize the consumption inefficiencies associated with the deviations from incremental pricing that may be necessary to recover total economic costs.

- *Fixed allocations:* Under this approach, policy makers set a fixed allocation based on principles of fairness or other considerations. For example, the jurisdictional separations treatment of cable & wire facilities Category 1.3, subscriber lines, is separated based on a fixed 75 percent state/ 25 percent interstate factor.

It would only be by coincidence that such an arbitrary approach had good efficiency characteristics.

While any price greater than marginal cost distorts consumption decisions, and any price greater than average incremental cost distorts investment incentives, the next cost recovery method takes demand into account to try to minimize the inefficiency associated with excessively high prices. Because it accounts for demand conditions, it typically is not considered a cost allocation mechanism:

- *Inverse elasticity rule (Ramsey pricing):* Ramsey pricing is a structure designed to maximize economic efficiency subject to the provider's overall revenue requirement.[24] Economic efficiency is served by recovering costs from those services whose consumption levels are least distorted by increases in prices above incremental costs. The price elasticity of demand is the standard measure of the responsiveness of the quantity demanded to price changes. Thus, under the simplest case of Ramsey pricing, those services with the lowest price elasticities of demand are assigned the highest shares of the common costs.[25]

Market—as well as firm-specific—price elasticities of demand generally need to be taken into account to find the most efficient pricing structure for recovering common costs.[26] Profit-maximizing firms, however, respond solely to firm-specific price elasticities. Unfortunately, the extent and direction of any bias between profit-maximizing and efficient pricing structures for cost recovery remains largely an open question. However, because ILEC unbundled network elements and exchange of traffic are vital inputs into the production

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[24] F. Ramsey, *A Contribution to the Theory of Taxation*, 37 Econ. J. (1927).

[25] More generally, one must account for income effects, cross-price substitution effects, and supply responsiveness.

[26] *Market elasticity* refers to the responsiveness of overall demand for a service. *Firm-specific elasticity* refers to the responsiveness of the demand faced by a particular supplier.

of competitive services. ILECs can be expected to seek inefficiently high overhead loadings and subsidy recovery from these services in order to raise rivals' costs.[27]

4. Universal Service Funding

Rather than unduly inflate charges for unbundled network elements, collocation, interconnection, and termination and transport—with the attendant efficiency losses—universal service policy should be fundamentally reformed. The current system of universal service is needlessly costly and inefficient with respect to both the way in which support is allocated and the way in which subsidy revenues are collected. Moreover, while the best way to achieve the fundamental universal service goal of ensuring that all Americans have access to telecommunications services at affordable rates is to promote competition,[28] the current system of cross subsidies and uneven obligations across telecommunications market participants both distorts competition and is threatened by it.

In its parallel universal service proceeding, the Commission should take a variety of steps to fix the system. The long-term policy toward the pricing of ILEC services and facilities needed by CLECs to offer service should go hand in hand with universal service reform. While the overall reform process will take time, a strong argument can be made that, in the interim, the Commission should not take actions—such as extending the current system of implicit cross-subsidies to CLECs—that will compound the problems of the current system.

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[27] See, e.g., T. Krattenmaker and S. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price*, Yale L. J. 234 (1986).

[28] Competition will need to be supplemented with targeted government programs in areas where there is a demonstrated market failure

5. Legacy Costs

ILECs can be expected to seek to recover legacy costs or so-called stranded investment costs through the prices charged for various interconnection services, including unbundled network elements, collocation, and transport and termination. Several considerations should be brought to bear on these attempts.

First, ILECs have economic incentives to overstate the magnitude of any stranded investment. Thus, the Commission should take a hard look at such claims to ensure that ILECs do not already cover their embedded costs and check if there is a need to have additional loadings pending overall reform of separations, interstate access, universal service, and the pricing of intrastate services. Any examination of this issue would have to look at the full range of revenues and costs associated with the local exchange network, both interstate and intrastate. In addition, one would want to check what is happening to overall traffic levels. In the presence of an overall increase in traffic levels, a carrier could see its total traffic rise while its market share falls.

A second point to consider is that, by asking that other providers pay for the ILECs past investments, ILECs are asking to be shielded from competition, both directly and indirectly. Directly, because they are asking to be guaranteed that they can cover their costs, without regard for whether these costs are at efficient levels. Indirectly, because they want to be able to raise actual and potential rivals' costs.

Third, any such charges will, in the end, affect the prices paid by subscribers. If policy makers believe that these legacy costs need to be recovered, then this recovery should be done through direct charges to end users, rather than distorting service production

decisions.[29] This approach is explicit, and done properly, second-best efficient. There are no sound economic grounds for hiding the recovery of these costs from consumers by embedding them in the rates end users pay for other services. Moreover, to the extent that these costs are viewed as universal service costs (as some ILECs claim), the 1996 Act calls for them to be explicit.

C. Summary

While marginal-cost pricing generally would promote consumption efficiency, the need to provide investment incentives suggests that total service long-run average incremental costs provide a good basis for pricing. Loadings on top of this to cover common costs, legacy costs, and universal service obligations will create consumption and investment distortions. Hence, such departures from marginal or incremental cost pricing should be kept as small as possible and should be carefully thought out along the lines discussed above.

III. APPLICATION TO THE PRICING OF COLLOCATION AND UNBUNDLED NETWORK ELEMENTS

Policy design should proceed from both long-term and interim perspectives, and the interim policy should be designed with an eye toward having a smooth transition to the long term.[30]

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[29] Charges to cover legacy costs can distort both consumption and production decisions. It may be possible to avoid distortions in production decisions by levying such charges directly on end users. The literature on efficient taxation (which is a parallel problem) suggests that inputs should not be taxed unless there is a specific objective that could not be realized by taxing end-user services. See, e.g., A. Auerbach, *The Theory of Excess Burden and Optimal Taxation*, 1 Handbook Pub. Econ. (1985).

[30] To avoid confusion, it is worth noting that the "long-term" from the perspective of policy design need not coincide with the "long term" as used to define long-term costs. For policy design, the time frame is driven by the ability to complete the necessary cost studies and rulemakings, including related rulemakings for access charge and universal service reform, among other factors. For purposes of cost definitions, the time frame is driven by the very different considerations of the technology and a firm's ability to adjust its input levels.

A. Interim Policy: The Advantages of Proxy Costs

As noted in the introduction, government intervention in interconnection pricing is potentially costly due both to administrative costs and potential distortions in consumption and investment.[31] Thus, for those network elements that are competitively supplied, regulatory intervention is neither needed nor desirable. Today, however, relatively few network elements are available on a competitive basis, and the development of widespread competition likely will take time. To the extent it is correct that key network elements will, as a practical matter, be available only from the relevant ILEC, some sort of explicit governmental intervention is needed in order to prevent the efficiency losses associated with the exercise of market power and raising rivals' costs.

One possibility would be to develop a full set of cost-based rates based on careful studies. This will, however, likely be a time-consuming process. In the interim, the Commission should rely on competition where it can and, for those elements that are not today competitively supplied, the Commission should develop the best proxy costs that one can in the short time frame available. If the Commission's objective is to mimic the effects of competition where it does not yet exist, then it should attempt to estimate the forward-looking costs of an efficient provider. For the reasons given in the overall discussion of economic pricing principles, the consumption of both unbundled network elements and the end-user services they are used to produce will be distorted if the ceiling rates for unbundled network elements include legacy costs, common costs, or implicit universal service cross-subsidies. These potential distortions in consumption and investment levels should be kept in mind when loading legacy costs common costs, or implicit universal service cross-subsidies into the charges for interconnection, unbundled network elements, and collocation.

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[31] In fact, one could expand the list to include the costs of the resources that private parties expend attempting to influence the outcome of the regulatory process.

B. Long-Term Considerations

Over time, the list of services subject to competition can be expected to grow, providing a path for phasing out regulation. There is, however, no guarantee with respect to how quickly competition will reduce ILEC market power over key network elements. Hence, the Commission should plan for long-term policies to oversee these prices.

As the Commission has recognized in a variety of instances, it is vital to build incentives for cost reduction into the regulatory pricing policies. A system under which an ILEC can price its unbundled network elements on a cost-plus or rate-of-return basis is seriously flawed because it provides little incentive for efficient cost reduction. Indeed, because such a regulatory regime would create a link between the ILEC's costs and those of its rivals, such regulation might create perverse incentives for an ILEC to increase its (actual or reported) costs in order to raise those of its rivals. Hence, it would be neither economically sound, nor consistent with the 1996 Act, to base the prices of unbundled network elements on a traditional cost-of-service basis.

Instead, where competitive markets do not exist, there are two options for setting price ceilings. One is to determine the price ceilings through proxy cost models that estimate the forward-looking costs of an efficient provider. This approach will most closely mimic competitive market forces, in which new entrants could be expected to come in using the most efficient technology available at the time. The use of such proxy costs to set price ceilings also will provide incentives for cost reduction by refusing to reward carriers for having high costs. To a large extent, this is the logic underlying price caps, and it is equally applicable here.

The Commission also could set long-term ceilings in a way more closely akin to price caps by attempting to estimate actual costs for each ILEC to initialize the price ceilings. After that, an industry-wide productivity factor could be applied in order to ensure that consumers shared the gains of technological progress. This approach too, clearly generates

cost-saving incentives. Moreover, from an efficiency perspective, a potential entrant should become an actual entrant if its costs are less than the *forward-looking* costs of the incumbent.[32] The use of actual ILEC costs, properly estimated on a forward-looking basis, would preserve these incentives, although their use would have the effect of punishing consumers and rewarding the ILEC for its inefficiency.

IV. APPLICATION TO COMPENSATION ARRANGEMENTS FOR TRANSPORT AND TERMINATION

Under section 251(b)(5) of the 1996 Act, each local exchange carrier has the obligation to establish reciprocal compensation arrangements with other carriers for the provision of transport and termination for traffic originating on one another's networks. The 1996 Act contemplates that these arrangements will, in the first instance, be determined through private negotiations between the carriers exchanging traffic. In the event of disagreement between two carriers, the relevant state commission will be called upon to arbitrate. In their review of these compensation arrangements, state commissions are directed by the 1996 Act to ensure that the arrangements between two carriers "provide mutual and reciprocal recovery by each carrier of costs associated with transport and termination" of each others traffic and that these costs be determined "on the basis of a reasonable approximation of the additional costs of terminating such calls."

This section addresses the economically appropriate standards to be applied in implementing this general mandate for state review. While the focus is on the standards themselves, before analyzing the alternatives it is worth noting the benefits of setting these standards at the federal level. Many of the companies planning to enter local exchange markets (*e.g.*, cable companies and interexchange carriers) are planning to do so on a

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[32] If the entrant can come into the market sooner than the incumbent can adjust its capital stock, then the relevant costs are the opportunity costs faced by the incumbent given its fixed capital stock.

multistate basis.[33] The costs of entry will be increased if new local service providers are subject to inconsistent policies across different states. The likely result will be to reduce or slow the introduction of competition into local exchange markets. To avoid such an outcome, the Commission should take the lead in implementing a consistent nationwide policy and set guidelines for acceptable transport and termination compensation agreements.

A. The Commission Should Promulgate National Guidelines for Arbitration of Disagreements over Compensation for Transport and Termination of Traffic

While private negotiations will play a central role in determining the terms of compensation arrangements for the transport and termination of traffic, there is an important role for public policy to play in ensuring that the outcome of these negotiations serves the public interest. By framing the environment in which the negotiations take place, public policy can have significant effects on the outcome even in those instances where neither the state commissions nor the Commission are not called upon to arbitrate a dispute.

The economic theory of bargaining clearly demonstrates that a party's ability to obtain an outcome favorable to itself depends on how that party would fare in the event that the current round of bargaining fails to reach an agreement. In other words, it depends on the party's *threat point*. If a party fares relatively well in the event that an agreement is not reached, then that party will tend to have a stronger hand in bargaining. Conversely, if the party fares poorly in the event an agreement is not reached, it will tend to have less bargaining power.

As a general matter two types of outcome are possible when a given round of bargaining does not conclude with an agreement. One, the entire negotiation might break down, with the result that the two parties go their separate ways without ever reaching an

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[33] The recent activity among the RBOCs suggest that they too believe that achieving broad, multistate operations will a key success factor in the telecommunications marketplace.

agreement. When there are potential gains from cooperation (*e.g.*, the network benefits from interconnecting two networks), these benefits are lost as a result of the breakdown. Alternatively, the negotiations may continue for an additional round or rounds of bargaining. Even in this case, however, the failure to conclude an agreement in the round in question is often costly, both because the bargaining process itself may consume resources and, more important, because the benefits of agreement are delayed.

Absent government oversight, the current economic environment in the local exchange telephony market gives rise to highly unequal bargaining positions in favor of ILECs in their negotiations with CLECs. In the absence of an agreement to transport and terminate one another's traffic, the ILEC can largely continue with business as usual. The CLEC, however, would likely be forced out of business, or more likely deterred from entering the market in the first place. Hence, the costs of a bargaining breakdown or delay are lower to ILECs than to competitive service providers. Moreover, in light of the fact that the negotiations are with would-be competitors, bargaining breakdowns or delays may actually be benefits from the ILEC perspective, rather than costs.

The public interest in the outcome of bargaining over compensation arrangements arises not from the transfer of income between the private parties, but rather from the effects of the resulting agreements on consumption and investment choices. The reason that there is a public interest in these bargaining outcomes is that ILECs have incentives to force rival providers to accept inefficient arrangements that have the effect of reducing the total social benefits derived from telecommunications services. There are at least four reasons that ILECs may seek inefficient terms for transport and termination. The first two follow from the fact that, in its role as a supplier with market power, an ILEC may set inefficiently high prices in order to extract greater economic rents for itself. This is, in effect, the standard

monopoly distortion. The third and fourth reasons fall under the general heading of raising rivals' costs:[34]

1. *The bargaining between ILECs and CLECs takes place under conditions of asymmetric information.* An ILEC cannot be sure of a CLEC's exact willingness to pay for transport and termination. This fact implies that a ILEC cannot rely on lump-sum charges to transfer economic rents to itself from the CLEC in a non-distorting way.[35] Instead, the ILEC needs to rely on metering, whereby the ILEC attempts to use the quantity of services demanded by the CLEC as a signal of its overall willingness to pay. This strategy gives rise to inefficiently high per-minute and dedicated facility rates for transport and termination

2. *Public policy limitations on price discrimination may have the unintended effect of inducing ILECs to set inefficiently high charges.* Asymmetric information problems notwithstanding, public policy prohibitions may prevent an ILEC from relying on individualized lump-sum charges to different carriers in order to transfer economic rents efficiently to itself from these carriers. Instead, the ILEC may be forced to offer the same pricing scheme to all carriers. Again, the ILEC implements a metering scheme that uses quantity-sensitive charges to extract economic rents and thus suppresses traffic.

3. *By setting high charges for transport and termination arrangements, ILECs may be able to weaken competition.* In an oligopolistic market, a firm

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[34] For additional discussion of this point, see Katz, Rosston, and Anspacher (1996). In essence, the third and fourth reasons demonstrate that bargaining may give rise to socially inefficient outcomes because of adverse effects on third parties—end users—whose welfare is not taken into account by the private parties to the negotiations.

[35] Actually, the anticipation of even a lump-sum collection of fees could distort the CLEC's overall entry decision.

generally benefits from an increase in the marginal costs faced by its rivals because such cost increases raise the profit maximizing prices for these rivals to charge.[36]

4. *By delaying the implementation of transport and termination arrangements, ILECs may be able to delay or weaken local exchange competition.* As already noted, in the absence of an agreement to transport and terminate one another's traffic the ILEC can largely continue with business as usual while potential CLEC would likely deterred from entering the market.

In summary, it is important to provide guidance to the private parties with respect to what constitutes an acceptable agreement. In light of the unequal bargaining power and the incentives for ILECs to negotiate inefficient interconnection arrangements, the public interest is served by having a pro-competition threat point defined by the Commission. In other words, private parties should know that if their negotiations break down, state commissions and the Commission will ensure that procompetitive arrangements for transport and termination of traffic are reached. Moreover, a uniform national policy is likely to reduce the costs of entry in comparison with a patchwork quilt of state regulatory approaches.

In closing this discussion, it is important to note that even very specific guidelines will allow the private parties to negotiate any modifications to these baseline arrangements that they find mutually beneficial. Under the provisions of the 1996 Act, private agreements will be subject to government guidelines only in the event that the parties are unable to agree and thus have to seek arbitration. Hence, private parties' flexibility to negotiate will be fully preserved even when the guidelines themselves are very specific.

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[36] This effect will arise even when the compensation scheme is symmetric if the carriers can to some extent separately influence the traffic flows in the two directions.

B. Interim Policy: An Administratively Simple Compensation Scheme Should be Used for Transport and Termination

As with the pricing of unbundled network elements, policy design should proceed from both long-term and interim perspectives. It will take a significant period of time to develop rates based on a detailed examination of costs. The delay associated with taking the time to develop such a system will likely slow the development of local exchange competition and reduce the realization of the attendant benefits.

There are two interim policies toward transport and termination compensation that would be comparatively easy to implement given the lack of time and resources that the Commission faces: (1) mandated bill and keep; and (2) a relatively simple mandated ceiling rate structure set to approximate total service long-run incremental costs. The remainder of this section discusses each option in turn.

(i) Bill and Keep

As discussed above, there is a public interest in having the Commission set a pro-competition threat point to guide the private parties in their negotiations with one another. One such threat point is to mandate a bill and keep system in the absence of any agreement to the contrary. Under this approach, the Commission would set guidelines for arbitration of disputes between ILECs and CLECs under which state commission would find transport and termination arrangements in compliance with the guidelines only if the following conditions are met: Each carrier designates a single point of interconnection for each defined service area. These designated points serve as the boundaries of the respective networks. Each carrier is then responsible for the costs associated with transport and termination within its network. The Commission could also mandate that any such arrangements include the 50-50 sharing of dedicated facilities connecting the points at which the two networks connect with one another. Alternatively, the Commission could set a guideline defining a meet point up to which each carrier was obligated to pay the costs.

As noted above, in order to promote efficiency, the private parties should be allowed to negotiate any modifications to these baseline arrangements that they find mutually beneficial. Indeed they could be expected to do so. The presence of clear and specific guidelines that allow private parties accurately to predict the outcome of arbitration tends to encourage parties to reach agreements that improve on that outcome, if they exist.

This policy is simple to implement and administer, and it economizes on resources expended by both the Commission and private parties. Objections to bill and keep typically are raised based on claims that it is not cost based. However, telecommunications economists generally agree that the traffic-sensitive costs of interconnection are primarily driven by the need to meet peak traffic levels. It follows that, for off-peak periods, bill and keep is the optimal interconnection pricing policy, both in terms of sending proper signals to end-users[37] and in terms of minimizing transactions costs.

There are costs of serving peak traffic. While, in theory, peak-load pricing would be appropriate if there were no transactions costs, there may be practical difficulties with implementing such a policy, such as shifting peaks, complex switch-specific peaks, and the issue of whether retail rates will mirror complex wholesale pricing schemes. The costs of rate development, billing, collection, and audit would likely outweigh the efficiency benefits of exact cost-based pricing. Moreover, it would take a significant period of time to develop a complex system of exact cost-based rates, and the delay associated with taking the time to develop such a system would likely slow the development of local exchange competition and diminish the benefits derived from the public switched telephone network.

Further, in terms of the role of prices as signals to guide consumption choices, there is a much greater risk from overpricing than from underpricing. Pricing transport and termination above long-run incremental cost distorts consumption choices downward. In

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[37] While pricing below cost can theoretically be optimal, negative prices clearly are problematical.

light of the fact that retail markets are not going to be perfectly competitive, even if transport and termination is priced below long-run incremental costs, overall end-user prices are unlikely to be too low. Indeed, there may be a public interest: (1) in having transport and termination rates set below cost (in theory, at least); and (2) in holding rates down even when the private parties would agree to raise them. Finally, to the extent that the need for interim rates is driven by a lack of information on ILEC costs, an interim policy of bill and keep will create greater pressures for ILECs to provide the data needed to develop long-term rates.

ILECs can be expected to oppose bill and keep on the grounds that it is unfair to them when traffic between an ILEC and CLEC is unbalanced and a disproportionate amount of the exchanged traffic originates on the CLEC's network. In this regard, it is important to note that the benefits of a call typically accrue to parties at *both* ends of the call. Hence, subscribers to both the ILEC and the CLEC benefit from the ability to exchange traffic, even when the flows are not balanced. Indeed, in comparison with having no ability to exchange traffic, the value of the ILEC's network to its subscribers would rise from an agreement that allowed only traffic flows from the CLEC's network to the ILEC's network. The reason is that ILEC subscribers would enjoy the network effects of being able to participate in calls originated by a larger number of people. Other than introspection, perhaps the clearest evidence that people value being able to receive calls is provided by the fact that parties pay for 800 numbers and one-way paging solely to be able to receive calls. What this demonstrates is that traffic direction alone is not a proper basis for determining cost recovery.

Some may argue that the use of bill and keep will give CLECs excessive incentives to rely on ILEC facilities. This concern is misplaced. The reason for ILEC-CLEC traffic exchange agreements is that for the foreseeable future, to reach most end users CLECs will be dependent on ILECs (who will use their local switching and local loops) to terminate calls

originating on CLEC network For these facilities, investments in substitute facilities will not be practical. Moreover, t) the extent that intercarrier bargaining over the terms of traffic exchange and the nature of ne work interconnection is efficient (as the ILECs have claimed it is in the LEC-CMRS proceed ng), incentives for using efficient facilities configurations for transport and termination arra igements will not be distorted by bill and keep. By setting a baseline in which each co-car ier is responsible for what happens to traffic within its network, bill and keep for tra isport and termination would give each co-carrier incentives to minimize the costs of carryin that traffic. This cost minimization may entail contracting with the other carrier to prov de certain network elements. Similarly, the private parties have incentives to choose arr ngements that minimize the costs that they jointly bear. A policy requiring that dedicate l facilities connecting two networks be subject to 50-50 cost sharing gives each party ince itives to reduce the costs of interconnecting the two networks when choosing its interconne tion point.

In summary, the argu nents in favor of a policy of bill and keep are the following. The relevant economic costs of interconnection are close to zero for much, if not all of the calling day. Moreover, ther is relatively little potential harm from having bill and keep on an interim basis, while there is the potential for significant economic harm if interconnection rates are set too high during his important period for the development of local exchange competition. While low tran sport and termination rates provide incentives for carriers to stimulate use of the public switched telephone network, overly high rates threaten the development of local exchan e competition. Lastly, it will take a significant period of time to develop any detailed, cost based system. The delay associated with taking the time to develop such a system could expected to slow the development of local competition and thus reduce the social benefits de ived from the public switched telephone network.

(ii) Simple Uniform Charges

If the Commission is concerned that bill and keep is unfair, or will lead to excessive consumption of calling services, then one alternative is to set a relatively simple interim rate structure involving positive charges. That rate structure could consist of a number of separate elements (as in the current system of interstate access charges), or could be a single charge covering a complete package of transport and termination. As with the bill and keep model discussed in the previous part, the Commission would have to choose whether to specify a single meet point or have each network specify the point at which its transport and termination services begin. In the latter case, the arguments for splitting the costs of the dedicated facilities connecting these points for two networks made in the previous part would be equally applicable here.

Properly set, a simple system of charges would have several positive characteristics. Once set, these charges would be relatively easy to administer, particularly if the Commission adopted a flat transport-and-termination charge. In order to avoid the losses in efficiency and welfare that would be triggered by a delay in implementing a pro-competition policy, the charges could be set using methodology that allows quick implementation. The use of proxy costs, rather than attempts to estimate actual costs carrier-by-carrier would simplify rate determination, in general, and, in particular, avoids the need to gather and analyze data on CLEC costs. Moreover, as discussed in the analysis of using proxy costs to set the prices of unbundled network elements, a fixed charge structure based on proxy costs would provide economic incentives for cost reduction. A disadvantage of this system would be that it would charge positive amounts for traffic in off-peak periods, for which the relevant economic costs are almost zero.

Clearly, no proxy will be perfect. For the reasons discussed in both the section on general pricing principles,[38] the social loss function is likely to be asymmetric, with greater losses from overly high pricing than from unduly low pricing. Moreover, as with bill and keep, to the extent that the need for interim rates is driven by a lack of information on ILEC costs, a rate that errs on the low side will create greater pressures for ILECs to provide the data needed to develop more accurate cost estimates on which to base rates.

There are a number of ways that the uniform charge or system of charges might be set in the interim. Two of the possibilities that have been raised are the use proxies based on existing generic studies of incremental costs (*e.g.*, The Hatfield Model[39]) and the reliance on existing rates of what are thought to be technically or physically comparable services (*e.g.*, interstate interexchange access), where those existing rates may or may not be subject to regulatory ceilings.[40] Where the existing rates are not subject to regulatory ceilings, a clear concern is that these rates may reflect the exercise of market power (the decision not to regulate them notwithstanding).

Examination of interstate access charges as basis for setting an interim rate structure illustrates some of the other factors that must be taken into account in developing a simple interim rate structure. First, there is the question of how complex to make the "simple" structure. Charges based on interstate, interexchange access charges, for example, could either mimic the entire structure, or be distilled to a simple uniform charge for transport and termination. If the Commission were to implement a simple uniform rate, the Commission would either have to develop a single template transport and termination arrangement or it

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[38] See Section III.B above.

[39] Hatfield Associates Inc., "The Costs of Basic Network Elements: Theory, Modeling, and Policy Implications," March 1996.

[40] For a much more complete discussion of alternative bases for the use of proxies to provide price ceilings, see Declaration of Bruce Owen, Attached hereto as Appendix 1.

might have one for direct-trunked transport and another for tandem-switched transport. The existing component rates used to build up the transport and termination rate structure must then be subject to analysis and correction. For example, use of a subset of existing access charges would result in inefficiently high transport and termination charges unless: (a) overheads were be backed out (b) the costs of dedicated facilities were split equally between the ILEC and its CLEC co-carrier; (c) the transport interconnection charge (TIC) and carrier common line charge (CCL charge) were excluded: and (d) switching charges were cleaned up to remove inappropriate elements. It is useful briefly to consider the elements in turn.

- *Entrance Facilities and Direct Trunked Transport Charges:* As dedicated facilities, the costs should be recovered on a non-traffic sensitive basis. Because the customers on both interconnected networks benefit from interconnection, it is appropriate to view the two networks as co-carriers. This implies that a cost sharing model in which the two parties split the costs of the facilities may be appropriate. For the reasons discussed above, loadings for overhead costs violate the principle of cost causation and distort consumption and investment decisions. For these reasons, the current values of these charges are likely to be inefficiently high to serve as the basis for constructing a simple uniform rate structure.
- *Tandem-Switched Transport Charges and Local Switching Charges.* Dedicated facilities used to provide tandem-switched transport should be subject to the same analysis as entrance facilities and dedicated transport. For shared switching facilities there are congestion, or capacity, costs associated with the fact that high traffic volumes lead to slower call processing. Congestion costs are zero in off-peak periods.

  The traffic-sensitive switching costs of transport and termination are measured by the costs of upgrading the switch to meet peak-period traffic volume. In assessing the costs of switch upgrades, it is important to exclude costs that are driven by other

factors including the introduction of new calling features, reductions in maintenance and operations costs, and needs triggered by other services, such as additional access lines. Moreover, to the extent that current access charges recover line card and other line-side expenses, they are improperly recovering non-traffic-sensitive costs through traffic-sensitive charges. Further, line card expenses are set up costs associated with connection of a particular subscriber to the public switched network and, from the perspective of cost causation, are more appropriately recovered from that subscriber.

Lastly, current local switching charges are based on fully distributed costs. As such, they do not fully reflect principles of cost causation, nor are they likely to represent even a second or third best means of generating contribution to toward common costs.

- *Transport Interconnection Charge and Carrier Common Line Charge.* Neither the TIC nor the CCL charge is based on principles of cost causation. Rather, the TIC is a residual designed to ensure the revenue neutrality of a restructuring of transport rates. And the CCL charge is a subsidy. Hence, based on principles of cost causation, neither has a place in transport and termination charges. Moreover, broadening the base of either charge to include CLECs without adjusting the rate downward would result in the ILECs' over-recovering the subsidy revenues or overheads that the each was designed to capture.

This type of analysis would have to be applied to the use of other existing regulated rates to ensure that they do not contain similar distortions.

C. Long-Term Considerations

As discussed in Section I, total service long-run average incremental cost is an appropriate pricing standard. The Commission must determine how to treat the issues of legacy costs, common costs, and universal service costs. For the reasons given in the overall

discussion of economic pricing principles, inclusion of legacy costs, common costs, or implicit universal service cross subsidies in the ceiling rates for transport and termination will distort both consumption and investment decisions. Many of these issues will be addressed simultaneously in the reform of access charges and universal service.

Two points are worth making here. First, total service long-run incremental cost represents a reasonable interpretation of the statutory requirement that transport and termination charges recover costs determined "on the basis of a reasonable approximation to the additional costs of terminating such calls."[41,42] Thus, Congress may already have decided the issues of how to treat legacy, common, and universal service cost recovery with respect to transport and termination.

Second, bill and keep may turn out to be the optimal long-run policy. The relevant economic costs may turn out to be close enough to zero to justify bill and keep because either: (1) it may be efficient to price transport and termination below cost; or (2) the costs of rate development and billing would outweigh any benefits of exact cost-based pricing. While it is not expected that the Commission would set transport and termination prices below incremental costs as a means of counteracting the effects of retail mark-ups, carriers may choose bill and keep for the second reason. If, in the long run, traffic is close to balanced on average, as one would expect in a broadly competitive market, then the net revenue effects of any symmetrically priced interconnection regime will be minimal. This fact does not, however, mean that policy makers should be indifferent to the compensation arrangement for transport and termination. Because of the potential effects on retail prices,

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41 47 U.S.C. § 252(d)(2).

42 As long as revenues from a service cover its total service long-run incremental costs, it is not being cross-subsidized by the users of any other service and is covering the additional costs that it generates. See J. Faulhaber, *Cross-subsidization: Pricing in Public Enterprises*, 65 Am. Econ. Rev. 966-977 (November 1975).

even when traffic flows are balanced in equilibrium, it is likely to be socially preferable to have lower rather than higher transport and termination charges.

V. CONCLUSION

While marginal-cost pricing generally would promote consumption efficiency, the need to provide investment incentives suggests that total service long-run average incremental costs provide a good basis for pricing. Loadings to cover common costs, legacy costs, and universal service obligations will create consumption and investment distortions. Thus, any such departures from marginal or incremental cost pricing should be kept as small is possible in light of other policy objectives. Moreover, any charges used to recover common costs, legacy costs, and universal service obligations should be explicit and should be designed with an eye toward minimizing the investment and consumption distortions that they induce.

Because of: (1) the complexities of the full set of inter-related rulemakings needed to treat the issues raised here; (2) the effort needed to gather and analyze the relevant cost data; and (3) the social value of implementing procompetitive telecommunications policies sooner rather than later, it is beneficial to implement simple interim policies that can be put into effect relatively quickly. This approach suggests the use of proxy costs for unbundled network elements and either bill and keep or a system of simple uniform charges for transport and termination.

GLOSSARY OF SELECTED TERMS

Average incremental cost:	Is the cost per-unit of producing a given amount of output above some base level.
Common cost:	Refers to the shared costs of two services or sets of services and can be defined as the sum of the stand-alone costs for the two product sets minus the cost of producing them together in a single firm.
Contribution:	Refers to the amount by which the revenue generated from the sale of an increment of service exceeds the cost of that increment and thus can be used to recover overheads or common costs.
Embedded costs:	These take into account expenditures made in the past.
Forward-looking costs: (or opportunity costs)	Economic costs are generally forward-looking. That is, the costs are based on the options available to the firm at the time which, in turn, depend on current input prices, and technology), and do not account for sunk expenditures.
Fully distributed costs:	Refers to systems of cost assignment in which *all* costs recorded in the books of account, including sunk investment and general overheads, are allocated among products and services, or combinations of categories of products and services.
Incremental cost:	The difference in total costs with and without the production of a specific amount of a service.
Long run:	A period of time of sufficient length that all inputs can be varied and none is fixed.
Long-run costs:	Refers to the costs that are relevant for a long-term decision-making horizon.
Marginal cost:	The additional cost incurred to produce one additional unit of calling services.
Overheads:	These are costs that cannot be assigned on the basis of cost causation to any one service or set of services.
Principle of cost causation:	Users of a service should pay for only those costs that are caused, or triggered, by the provision of service to them.
Short run:	A time period over which the quantity of one input can be varied, but the quantities of all of the firm's other factors of production cannot be adjusted.

Short-run costs:	Refer to the costs that are relevant for a short-run decision-making horizon.
Stand-alone cost:	Is the cost of providing a service in isolation
Total service incremental costs:	Refers to the value of incremental costs when the increment is defined to be an entire service.

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CERTIFICATE OF SERVICE

I, Rowena Y. Holt do hereby certify that on this 16th day of May, 1996, a copy of the foregoing Comments of The National Cable Television Association, Inc. was hand-delivered to the following:

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